(No Model.) 2 Sheets—Sheet 1.

B. F. ORTON.

ARMATURE FOR DYNAMO ELECTRIC MACHINES.

No. 323,363. Patented July 28, 1885.

Fig. 1.

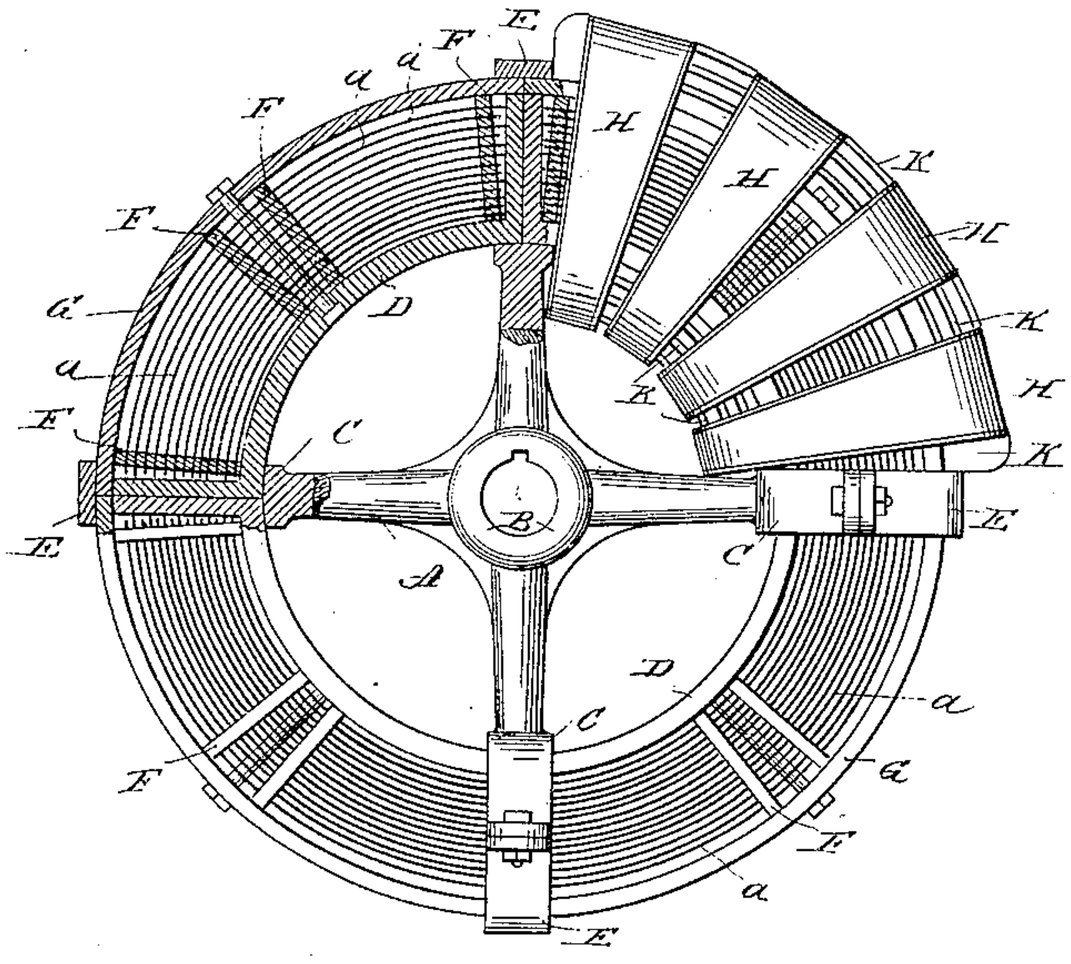


Fig. 2.

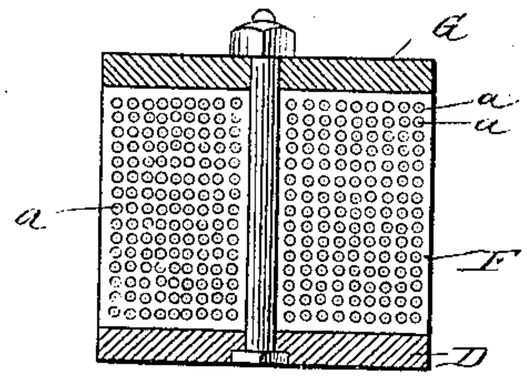
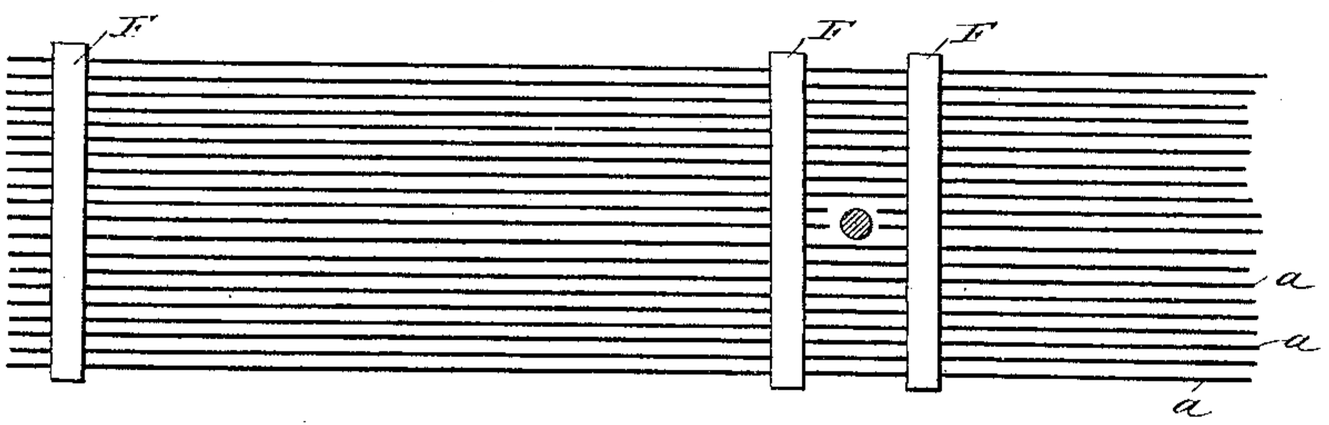


Fig. 3,



Witnesses:
Ernest Abshagen
Thos. Toomey

Inventor:
B. F. Orton
By his Attorney: H. L. Turner.

(No Model.) 2 Sheets—Sheet 2.

B. F. ORTON.

ARMATURE FOR DYNAMO ELECTRIC MACHINES.

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Fig. 4.

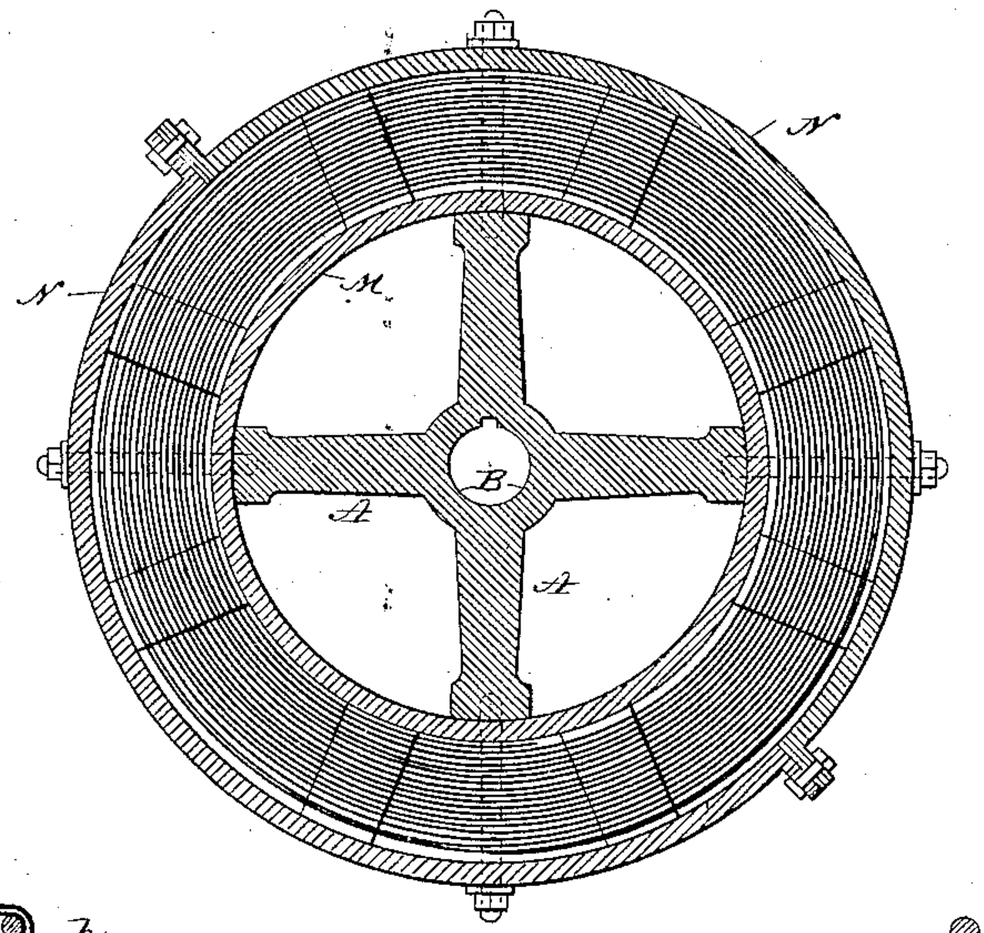


Fig. 5,

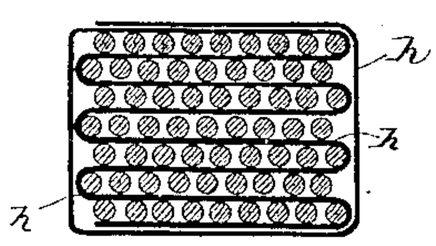


Fig. 7,

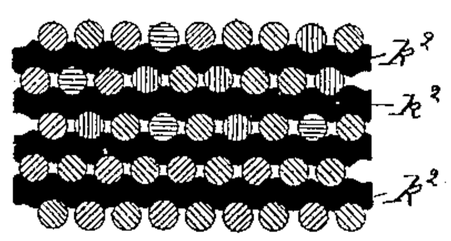


Fig. 6,

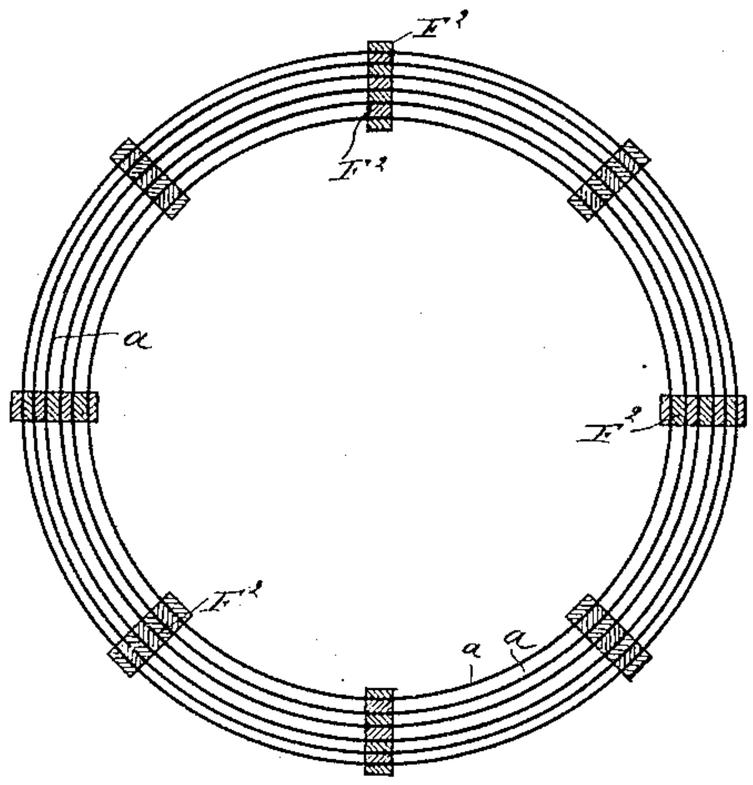


Fig. 9.

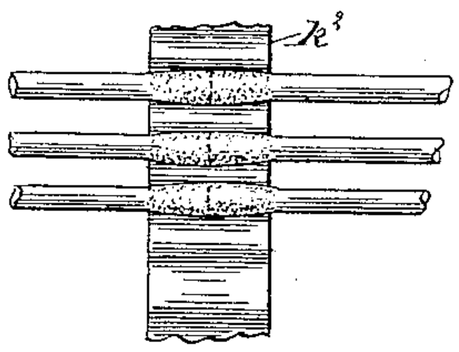
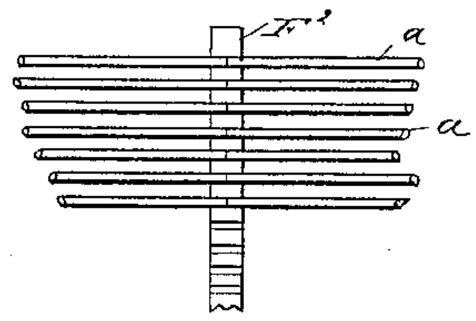


Fig. 8.



Witnesses:
Ernest Hyshagen
Thos Dewney

Inventor:
B. F. Orton
By his Attorney: W. B. Townsend

UNITED STATES PATENT OFFICE.

BENJAMIN F. ORTON, OF EAST SAGINAW, MICHIGAN.

ARMATURE FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 323,363, dated July 28, 1885.

Application filed July 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. ORTON, a citizen of the United States, and a resident of East Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Armatures for Dynamo-Electric Machines, of which the following is a specification.

My invention relates to the construction of cores for magnets, and more especially to the cylindrical or annular magnets constituting the armatures for dynamo electric machines or motors.

The object of my invention is to secure economy of construction with, at the same time, freedom from heating. The aim of the invention is also to attain a great developing of electricity with small expenditure of power.

My invention consists, essentially, in constructing the core or body of the armature in a dynamo-electric machine or motor from wires supported out of contact with one another, so as to leave free air-spaces between them, and to thus secure freedom of ventilation and immunity from the circulation of Foucault or induced currents to the greatest degree possible. I prefer, in practice, to so support every wire of the core that it shall be separated from every other wire by a free air-space for the greater portion of its length. I may, however, arrange the wires in parallel planes, with those of the same plane resting, if desired, against one another, but separated from those of an adjoining plane by a free air-space. The wires of the same plane might be in magnetic contact, or each wire may have a thin insulating coating of varnish or similar material. In this case the advantages of fine subdivision are attained, but good ventilation is not secured to the same degree as when the wires of the individual planes are separated from one another by free air-spaces. The wires may obviously be arranged in planes that cut the armature-axis or in planes transverse to the plane of rotation of the armature.

My invention consists, also, of details of construction that will be more particularly specified in the claims.

Some of the forms that my invention may take in practice are shown in the accompanying drawings.

Figure 1 is a side view and partial section of an armature for a dynamo electric machine or motor constructed in accordance with my invention. Fig. 2 is a transverse section of said armature. Fig. 3 shows the wires of a single plane transverse to the plane of rotation of the armature. Figs. 4 and 6 illustrate the application of the invention to other forms of armature. Figs. 5 and 7 show ways of supporting the wires so as to leave free air-spaces between them. Figs. 8 and 9 illustrate details of construction that may be employed when the armature is built up in the form shown in Fig. 6.

In Fig. 1, A indicates the spokes or arms of a spider or frame upon which the parts of a sectional armature may be secured, and B the hub from which said spokes project. The spokes A terminate at C in heads transversely extended to form seats for the ends of tray-like supporting-plates D D, of which there may be any desired number, dependent on the number of plates C. The ends of the plates or trays D are clamped by cross-pieces or stirrups E, which extend transversely across the ends of the trays D, and are clamped or bolted to the upturned sides of the heads C. The trays D carry the wires making up the body of the armature. The wires indicated at *a a* are each of sufficient length to extend from one end to the other of the trays D, and may, if desired, abut against the upturned ends of the latter, or, if desired, the ends of the wires at the same end of the tray in alternate planes may abut against the latter, this arrangement being adopted to secure insulation of the wires from one another, and thus furnish an obstacle to the circulation of Foucault currents. The wires are supported out of contact with one another by resting in bridges F, which may be of any desired material, magnetic or non-magnetic. If they be of conducting material, the wires are preferably insulated from one another by insulating bushings or by a coating of insulating material. If the bridges or plates be of iron, the wires may be magnetically and electrically insulated by applying to them a thin coat of varnish.

Retaining-plates G serve to hold the wires and bridges in the tray, and are bolted or otherwise secured to the tray or other part. The caps or stirrups E pass over the ends of

the plates G, as well as the upturned abutting ends of the trays. The wires in this arrangement are supported separately with free air-spaces between them. Free-air spaces extend between them, both in planes transverse to the axis and transverse to the plane of rotation.

The advantages of this arrangement are obviously secured, though in less degree, by having free air-spaces in one set of planes only, the wires being in contact with, but preferably insulated from, one another in parallel planes. Thus, for instance, the wires may lie against one another in planes transverse to the plane of rotation of the armature, and free air-spaces may be left in the planes between them only, the spaces in the planes transverse to the axis being then virtually closed. In this case the wires are preferably provided with insulating sheaths, although this is not absolutely necessary.

The coils for the armature are indicated at H, and are wound upon bobbins or spools provided with separate projecting pieces K, adapted to keep the coils and bobbins the proper distance apart. The bobbins or spools at the end of the section abut against the pieces E and are thus prevented from slipping on the core.

In the modification shown in Fig. 4, the armature is continuous, and is made by winding the wire upon a frame, M, as upon a reel. The layers of wire in adjoining planes transverse to the plane of rotation are held apart by strips k, of pliable metal or other material of the requisite thickness to leave free air-spaces and interposed between successive layers, as at points N. In Fig. 5 the interposed strip is of a single piece, and is interwoven with the wires in successive planes.

Wires or portions of wires adjoining one another in the same plane transverse to the plane of rotation may be kept apart by laying them over the spaces between the adjoining wires in the layer beneath, the piece k being sufficiently pliable or yielding to permit the wire to sink into the depression. If desired, rigid separating pieces might be used, as indicated at k^2, Fig. 7, the latter being in such case crimped or grooved to form seats or depressions, by which the wires in the same plane transverse to the plane of rotation will be held apart. These pieces are interposed at suitable distances apart, and may be made of any desired material, preferably iron, the wires being insulated from them by any desired means.

Instead of making the continuous armature from a continuous wire wound upon a form or carrier, it may be made up from separate rings or annuli, each consisting of a number of separate wires, constituting individually rings or annuli, and arranged in a plane transverse to the plane of rotation. This modification is indicated in Figs. 6, 8, and 9.

The ends of the separate wire rings in the same plane may be soldered together, as indicated in Fig. 9, and the wires or rings in contiguous planes transverse to the plane of rotation may be held apart by pieces k^2, such as indicated in Fig. 7, or otherwise; or the ends of a wire may be brought together and secured in a perforated block or piece, F^2, Fig. 8, perforated to receive and hold the ends securely. Such bridges F^2 or separating pieces k^2 may be used at any desired number of points around the armature, as indicated in Fig. 6. In this construction the separate wires each consist of a complete ring in itself.

In the construction of Fig. 4, the separate wires of my invention are in fact separate turns of the same continuous wire.

I do not limit myself to the particular mechanical arrangements herein described for keeping the wires separated individually or in planes, and many other mechanical devices will naturally occur to those skilled in the art whereby an armature may be made having the peculiar and novel features forming my invention and herein claimed.

It is obvious that the wire may be round, square, or of any desired form in cross-section.

What I claim as my invention is—

1. In a dynamo-electric machine or motor, an armature whose core is made up of parallel wires supported out of contact with one another and having intermediate free air-spaces.

2. In a dynamo-electric machine or motor, an armature made up of wires arranged in superposed planes, the wires in one plane being separated from those in an adjoining plane by free transverse air-spaces.

3. In a dynamo-electric machine or motor, an armature made up of wires or portions of wire supported out of contact and having intervening air-spaces between contiguous wires.

4. In a dynamo-electric machine or motor, the combination, with a series of wires or portions of wire forming in whole or in part the armature-core, of supporting-bridges in which said wires rest separately.

5. The combination, with the wires forming the core for magnet-coils, of one or more supporting-bridges, as and for the purpose described.

6. The combination, with the wires forming a core for magnet-coils, of a perforated bridge, as and for the purpose described.

7. The combination, with the sectional tray-like holders abutting against one another, of a mass of iron wires supported on said tray, with intervening air-spaces between the wires, as and for the purpose described.

Signed at New York, in the county of New York and State of New York, this 9th day of July, A. D. 1884.

BENJAMIN F. ORTON.

Witnesses:

THOS. TOOMEY,

J. F. COFFIN.